

What is claimed is:

1. A method for boundary based image segmentation comprising:

segmenting an image;

5 providing a level set representation of the segmentation for interaction;

providing an edit point of the level set representation;

10 converting the edit point into a propagation constraint; and

determining a segment according to the edit point and the level set representation.

2. The method of claim 1, wherein the edit point is one of
15 a control point and a sequence of connected points.

3. The method of claim 1, wherein converting further comprises deriving a shape constraint within a level set framework wherein an interpolation converts the edit point
20 into a closed structure.

4. The method of claim 2, further comprising enforcing a smoothness constraint on the level set representation to correct a local discrepancy given the control point.

5. The method of claim 2, further comprising replacing a segment of the level set representation with an interaction segment according to the control point.

5

6. The method of claim 5, wherein the segment of the level set representation is determined to lie within a predetermined distance from the control point.

10 7. The method of claim 5, further comprising introducing the interactive segment, wherein the interactive segment is determined by a quadratic interpolation between the control point and the segment of the level set representation.

15 8. The method of claim 2, wherein the sequence of connected points provides a number of control points in a clock-wise order that when connected define a closed curve.

9. The method of claim 8, further comprising recovering a
20 global constraint that forces the level set representation to go through the number of control points.

10. The method of claim 1, further comprising evolving the level set representation according to the propagation constraint.

5 11. The method of claim 10, further comprising minimizing a distance between the evolving level set representation and the propagation constraint.

12. The method of claim 1, wherein the propagation
10 constraint is enforced more stringently closer to the control point.

13. The method of claim 10, further comprising evolving the level set representation locally towards the propagation
15 constraint.

14. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for boundary based image
20 segmentation, the method steps comprising:

segmenting an image;

providing a level set representation of the segmentation for interaction;

providing an edit point of the level set
representation;

converting the edit point into a propagation
constraint; and

5 determining a segment according to the edit point and
the level set representation.

15. A method for image segmentation comprising:

providing a level set representation of an image
10 segmentation for interaction;

requesting user-interaction for editing the level set
representation;

determining a propagation constraint according to the
user-interaction; and

15 determining an evolved level set representation,
wherein a portion of the evolved level set representation is
locally affected by the propagation constraint.

16. The method of claim 1, wherein the user-interaction is
20 one of a control point and a sequence of connected points.

17. The method of claim 16, further comprising enforcing a
smoothness constraint on the level set representation to
correct a local discrepancy given the user-interaction.

18. The method of claim 16, further comprising the portion of the evolved level set representation replaces a corresponding portion of the level set representation.

5

19. The method of claim 18, wherein the portion segment of the level set representation is determined to lie within a predetermined distance from the user-interaction.

10